

### IN THE CLAIMS

Please amend the claims as follows:

1-38. (Canceled)

39. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:  
forming the first functional circuit on a first surface of a semiconductor substrate;  
forming a hole through the semiconductor substrate;  
forming an optical fiber having a cladding layer and a core in the hole, the core having a core hole running through the core; and  
interconnecting the first and the second functional circuits together via the optical fiber.

40. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:  
forming the first functional circuit on a first surface of a semiconductor substrate;  
forming a hole through the semiconductor substrate;  
forming an optical fiber having a cladding layer and a core in the hole; and  
interconnecting the first and the second functional circuits together via the optical fiber  
~~The method of claim 39~~, wherein forming the hole comprises forming an etch pit at a selected location of the first surface of the semiconductor substrate, and performing an anode etch of the semiconductor substrate such that the hole is formed at the location of the etch pit.

41. (Previously Presented) The method of claim 39, wherein forming the optical fiber comprises forming the cladding layer so as to surround the core, the cladding layer having a first index of refraction, and the core having a second index of refraction that is greater than the first index of refraction.

42. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:

forming the first functional circuit on a first surface of a semiconductor substrate;

forming a hole through the semiconductor substrate;

forming an optical fiber having a cladding layer and a core in the hole; and

interconnecting the first and the second functional circuits together via the optical fiber

~~The method of claim 39~~, wherein forming the optical fiber comprises forming a core with a core hole, the core hole running substantially along the center of the optical fiber.

43. (Previously Presented) The method of claim 39, wherein forming the optical fiber comprises forming the cladding layer of silicon oxide, and forming the core of a material having an index of refraction that is greater than the index of refraction of the cladding layer.

44. (Previously Presented) The method of claim 39, wherein forming the optical fiber comprises forming the cladding layer of aluminum oxide, and forming the core of a material having an index of refraction that is greater than the index of refraction of the cladding layer.

45. (Previously Presented) The method of claim 39, wherein interconnecting the first and second functional circuits together includes coupling a node of the first functional circuit to a first end of the optical fiber and coupling a node of the second functional circuit to a second end of the optical fiber.

46. (Previously Presented) The method of claim 45, wherein one of the nodes of the first and the second functional circuits is coupled to the optical fiber using an optical transmitter, and the other of the nodes is coupled to the optical fiber using an optical receiver.

47. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:

forming the first functional circuit on a first surface of a semiconductor substrate;

forming a hole through the semiconductor substrate;

forming an optical fiber having a cladding layer and a core in the hole; and  
interconnecting the first and the second functional circuits together via the optical fiber  
~~The method of claim 39~~, further comprising lining the hole with a reflecting mirror prior to forming the cladding layer.

48. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:  
forming a first functional circuit on a first surface of a semiconductor substrate;  
forming a second functional circuit on a second surface of the semiconductor substrate, the second surface of the semiconductor substrate being opposite the first surface;  
forming a hole through the semiconductor substrate;  
forming an optical fiber having a cladding layer and a core in the hole, the core having a core hole running through the core; and  
interconnecting the first and the second functional circuits together via the optical fiber.

49. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:  
forming a first functional circuit on a first surface of a semiconductor substrate;  
forming a second functional circuit on a second surface of the semiconductor substrate,  
the second surface of the semiconductor substrate being opposite the first surface;  
forming a hole through the semiconductor substrate;  
forming an optical fiber having a cladding layer and a core in the hole; and  
interconnecting the first and the second functional circuits together via the optical fiber  
~~The method of claim 48~~, wherein forming the hole comprises forming an etch pit at a selected location of the first surface of the semiconductor substrate, and performing an anode etch of the semiconductor substrate such that the hole is formed at the location of the etch pit.

50. (Previously Presented) The method of claim 48, wherein forming the optical fiber comprises forming the cladding layer so as to surround the core, the cladding layer having a first

index of refraction, and the core having a second index of refraction that is greater than the first index of refraction.

51. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:  
forming a first functional circuit on a first surface of a semiconductor substrate;  
forming a second functional circuit on a second surface of the semiconductor substrate,  
the second surface of the semiconductor substrate being opposite the first surface;  
forming a hole through the semiconductor substrate;  
forming an optical fiber having a cladding layer and a core in the hole; and  
interconnecting the first and the second functional circuits together via the optical fiber

~~The method of claim 48,~~ wherein forming the optical fiber comprises forming a core with a core hole, the core hole running substantially along the center of the optical fiber.

52. (Previously Presented) The method of claim 48, wherein interconnecting the first and second functional circuits together includes coupling a node of the first functional circuit to a first end of the optical fiber and coupling a node of the second functional circuit to a second end of the optical fiber.

53. (Previously Presented) The method of claim 52, wherein one of the nodes of the first and the second functional circuits is coupled to the optical fiber using an optical transmitter, and the other of the nodes is coupled to the optical fiber using an optical receiver.

54. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:  
forming a first functional circuit on a first surface of a semiconductor substrate;  
forming a second functional circuit on a second surface of the semiconductor substrate,  
the second surface of the semiconductor substrate being opposite the first surface;  
forming a hole through the semiconductor substrate;  
forming an optical fiber having a cladding layer and a core in the hole; and

interconnecting the first and the second functional circuits together via the optical fiber  
~~The method of claim 48~~, further comprising lining the hole with a reflecting mirror prior to forming the cladding layer.

55. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:  
forming a first functional circuit on a first surface of a first semiconductor substrate;  
forming a second functional circuit on a first surface of a second semiconductor substrate;  
forming a hole through the first semiconductor substrate;  
bonding the first and the second semiconductor substrates together;  
forming an optical fiber having a cladding layer and a core in the hole, the core having a core hole running through the core; and  
interconnecting the first and the second functional circuits together via the optical fiber.

56. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:  
forming a first functional circuit on a first surface of a first semiconductor substrate;  
forming a second functional circuit on a first surface of a second semiconductor substrate;  
forming a hole through the first semiconductor substrate;  
bonding the first and the second semiconductor substrates together;  
forming an optical fiber having a cladding layer and a core in the hole; and  
interconnecting the first and the second functional circuits together via the optical fiber  
~~The method of claim 55~~, wherein forming the hole comprises forming an etch pit at a selected location of the first surface of the first semiconductor substrate, and performing an anode etch of the first semiconductor substrate such that the hole is formed at the location of the etch pit.

57. (Previously Presented) The method of claim 55, wherein forming the optical fiber comprises forming the cladding layer so as to surround the core, the cladding layer having a first

index of refraction, and the core having a second index of refraction that is greater than the first index of refraction.

58. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:

forming a first functional circuit on a first surface of a first semiconductor substrate;

forming a second functional circuit on a first surface of a second semiconductor

substrate;

forming a hole through the first semiconductor substrate;

bonding the first and the second semiconductor substrates together;

forming an optical fiber having a cladding layer and a core in the hole; and

interconnecting the first and the second functional circuits together via the optical fiber

~~The method of claim 55~~, wherein forming the optical fiber comprises forming a core with a core hole, the core hole running substantially along the center of the optical fiber.

59. (Previously Presented) The method of claim 55, wherein interconnecting the first and second functional circuits together includes coupling a node of the first functional circuit to a first end of the optical fiber and coupling a node of the second functional circuit to a second end of the optical fiber.

60. (Previously Presented) The method of claim 59, wherein one of the nodes of the first and the second functional circuits is coupled to the optical fiber using an optical transmitter, and the other of the nodes is coupled to the optical fiber using an optical receiver.

61. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:

forming a first functional circuit on a first surface of a first semiconductor substrate;

forming a second functional circuit on a first surface of a second semiconductor

substrate;

forming a hole through the first semiconductor substrate;

bonding the first and the second semiconductor substrates together;  
forming an optical fiber having a cladding layer and a core in the hole; and  
interconnecting the first and the second functional circuits together via the optical fiber

~~The method of claim 55~~, further comprising lining the hole with a reflecting mirror prior to forming the cladding layer.

62. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:

forming a first functional circuit on a first surface of a first semiconductor substrate, the first semiconductor substrate also having a second surface opposite the first surface;

forming a second functional circuit on a first surface of a second semiconductor substrate, the second semiconductor substrate also having a second surface opposite the first surface;

forming a first hole through the first semiconductor substrate;

forming a second hole through the second semiconductor substrate;

bonding the second surface of the first semiconductor substrate to the second surface of the second semiconductor substrate;

forming an optical fiber having a cladding layer and a core in the first and the second holes, the core having a core hole running through the core; and

interconnecting the first and the second functional circuits together via the optical fiber.

63. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:

forming a first functional circuit on a first surface of a first semiconductor substrate, the first semiconductor substrate also having a second surface opposite the first surface;

forming a second functional circuit on a first surface of a second semiconductor substrate, the second semiconductor substrate also having a second surface opposite the first surface;

forming a first hole through the first semiconductor substrate;

forming a second hole through the second semiconductor substrate;

bonding the second surface of the first semiconductor substrate to the second surface of the second semiconductor substrate;

forming an optical fiber having a cladding layer and a core in the first and the second holes; and

interconnecting the first and the second functional circuits together via the optical fiber

~~The method of claim 62~~, wherein forming the first hole includes forming an etch pit at a selected location of the first surface of the first semiconductor substrate and performing an anode etch of the first semiconductor substrate to form the first hole at the location of the etch pit, and forming the second hole includes forming a second etch pit at a selected location of the first surface of the second semiconductor substrate and performing an anode etch of the second semiconductor substrate to form the second hole at the location of the second etch pit.

64. (Previously Presented) The method of claim 62, wherein interconnecting the first and second functional circuits together includes coupling a node of the first functional circuit to a first end of the optical fiber and coupling a node of the second functional circuit to a second end of the optical fiber.

65. (Previously Presented) The method of claim 64, wherein one of the nodes of the first and the second functional circuits is coupled to the optical fiber using an optical transmitter, and the other of the nodes is coupled to the optical fiber using an optical receiver.

66. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:

forming a first functional circuit on a first surface of a first semiconductor substrate, the first semiconductor substrate also having a second surface opposite the first surface;

forming a second functional circuit on a first surface of a second semiconductor substrate, the second semiconductor substrate also having a second surface opposite the first surface;

forming a first hole through the first semiconductor substrate;

forming a second hole through the second semiconductor substrate;

bonding the second surface of the first semiconductor substrate to the second surface of the second semiconductor substrate;



forming an optical fiber having a cladding layer and a core in the first and the second holes; and

interconnecting the first and the second functional circuits together via the optical fiber

~~The method of claim 62~~, further comprising lining the first and the second holes with a reflecting mirror prior to forming the cladding layer.

67. (Previously Presented) The method of claim 62, wherein bonding the first and the second semiconductor substrates is performed such that the first hole and the second hole are in alignment.

68. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:

forming a first functional circuit on a first surface of a first semiconductor substrate, the first semiconductor substrate also having a second surface opposite the first surface;

forming a second functional circuit on a first surface of a second semiconductor substrate, the second semiconductor substrate also having a second surface opposite the first surface;

forming a hole through the first semiconductor substrate;

bonding the second surface of the first semiconductor substrate to the first surface of the second semiconductor substrate;

forming an optical fiber having a cladding layer and a core in the hole, the core having a core hole running through the core; and

interconnecting the first and the second functional circuits together via the optical fiber.

69. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:

forming a first functional circuit on a first surface of a first semiconductor substrate, the first semiconductor substrate also having a second surface opposite the first surface;

forming a second functional circuit on a first surface of a second semiconductor substrate, the second semiconductor substrate also having a second surface opposite the first surface;

forming a hole through the first semiconductor substrate;

bonding the second surface of the first semiconductor substrate to the first surface of the second semiconductor substrate;

forming an optical fiber having a cladding layer and a core in the hole; and

interconnecting the first and the second functional circuits together via the optical fiber

~~The method of claim 68~~, wherein forming the hole includes forming an etch pit at a selected location of the first surface of the first semiconductor substrate, and performing an anode etch of the first semiconductor substrate to form the hole at the location of the etch pit.

70. (Previously Presented) The method of claim 68, wherein interconnecting the first and second functional circuits together includes coupling a node of the first functional circuit to a first end of the optical fiber and coupling a node of the second functional circuit to a second end of the optical fiber.

71. (Previously Presented) The method of claim 70, wherein one of the nodes of the first and the second functional circuits is coupled to the optical fiber using an optical transmitter, and the other of the nodes is coupled to the optical fiber using an optical receiver.

72. (Currently Amended) A method of forming an electronic system, the electronic system including a first functional circuit interconnected to a second functional circuit, comprising:

forming a first functional circuit on a first surface of a first semiconductor substrate, the first semiconductor substrate also having a second surface opposite the first surface;

forming a second functional circuit on a first surface of a second semiconductor substrate, the second semiconductor substrate also having a second surface opposite the first surface;

forming a hole through the first semiconductor substrate;

bonding the second surface of the first semiconductor substrate to the first surface of the second semiconductor substrate;

forming an optical fiber having a cladding layer and a core in the hole; and

interconnecting the first and the second functional circuits together via the optical fiber

~~The method of claim 68~~, further comprising lining the hole with a reflecting mirror prior to forming the cladding layer.

73-82. (Canceled)